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Vincent Lawson

Iowa State University, vlawson@iastate.edu

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Plant Density Effects on Aphrodite and Eclipse Muskmelon

Abstract

The objective of this two-year study was to determine the effect of within-row hill spacing and the number of plants/hill on the yield and fruit size of Aphrodite and Eclipse muskmelon. This two-year study found that Eclipse produced its best early and total yields while maintaining large fruit size in a planting arrangement of one plant every 21 in. and in rows 7 ft apart, equaling a population of 3,556/acre. Aphrodite bore fewer but larger fruit on a plant and produced its best total yield when planted in a high-density arrangement of one plant every 11 in. or 7,112 plants/acre. However, like Eclipse, its early yield was increased when spaced one plant every 21 in. in the row.

Disciplines

Agricultural Science | Agriculture

Plant Density Effects on Aphrodite and Eclipse Muskmelon

Vince Lawson, farm superintendent

Introduction

The objective of this two-year study was to determine the effect of within-row hill spacing and the number of plants/hill on the yield and fruit size of Aphrodite and Eclipse muskmelon. This two-year study found that Eclipse produced its best early and total yields while maintaining large fruit size in a planting arrangement of one plant every 21 in. and in rows 7 ft apart, equaling a population of 3,556/acre. Aphrodite bore fewer but larger fruit on a plant and produced its best total yield when planted in a high-density arrangement of one plant every 11 in. or 7,112 plants/acre. However, like Eclipse, its early yield was increased when spaced one plant every 21 in. in the row.

Materials and Methods

Planting. Seeding was done in 72 cell trays in the greenhouse in mid-April. Transplanting to field was done on May 19, 2004, and May 20, 2005.

Plot Design. A randomized complete block, with three replications was the plot design. Each plot was one row of ten hills at respective treatment spacing. Two hills of honeydew were planted at each end of the plot to minimize end-plant effects. Row spacing was 7 ft. Five plant population treatments (see Table 1) for two cultivars (Aphrodite, Eclipse) for three replications totaled 30 plots.

Culture. The soil was a loamy sand type. Plants were grown on 4-ft-wide black plastic mulch with drip irrigation. Drip tubes with different flow rates were utilized so that all plots received an adequate amount of water and the soil was kept moist under mulch. Fertilizer was applied preplant incorporated and during the season

through drip tubes using liquid 28% UAN (nitrogen) and water soluble 21-5-20 (NPK).

Pest Control. Curbit, Sandea, Poast were the herbicides; Capture, Furadan, Sevin XLR were the insecticides; Bravo and Quadris were the fungicides.

Results and Discussion

It should be noted that the study was not stressed by unfavorable growing conditions. Both seasons provided plenty of sunshine and warm temperatures while a specially designed drip-irrigation system supplied adequate water and fertilizer to all plots. Almost all harvested fruit were attractive, firm, and good tasting. I expected fruit from the high-density plantings to be smaller and of lesser quality than they were in this study — but they weren't — which indicates these hybrids have incredible yield potential when given the right growing conditions.

Overall performance of Eclipse and Aphrodite was similar to what has been seen in cultivar trials (see Muskmelon and Honeydew Cultivar Trial, Annual Fruit/Vegetable Progress Report 2003, FG 601). Eclipse produced more fruit and higher yields than Aphrodite at each planting arrangement, although average fruit weights were smaller. Soluble solids readings weren't taken for individual treatments, but random sampling with a refractometer found little variation. Testing showed approximately 11% for Aphrodite and 10.5% for Eclipse during 2004 and around 11.5% for both cultivars during 2005.

Table 1 shows that as plant population increased for Aphrodite so did total yield, with the closest spacing of one plant every 11 in. providing the greatest number of fruit and the

highest yield. Although there was a small decrease in average fruit size with this planting arrangement, it was mostly in the large category (seven pounds or greater), with a greater yield of medium-sized fruit (five to seven pounds). Eclipse performed a little differently than Aphrodite, producing its best yield in the one plant every 21 in. arrangement. Higher plant populations (7,112 plants/acre) did not increase total yield for Eclipse; in fact, it resulted in smaller fruit and significantly less early yield.

Comparing the practice of planting one versus two plants/hill, I saw no strong advantage to doubling the plant population with two plants/hill at either the 32 in. or 21 in. spacing. While total yields were often increased by doubling, there was always a decrease in early yield and smaller average fruit weights. Generally, using one plant/hill produced larger and more uniform fruit weights. Eclipse produced its best yield at one plant/hill every 21

in., while Aphrodite produced its best yield at one plant every 11 in.

Earliness is often a desirable characteristic because it extends the marketing season. Cultivar selection can be important in this regard. In trials and in commercial plantings, I have observed Aphrodite to ripen quicker, or at least produce larger early pickings than Eclipse, making it a better choice for early-season marketing. However, these maturity differences aren't always enough, and cultural practices that enhance earliness can also be very important. Interestingly, this study showed that the planting arrangement had a significant effect on the number of fruit harvested early. Note that both cultivars produced their largest early yield with an arrangement of one plant every 21 in. (3,556 plants/acre) and that early yield fell off when planting density either increased or decreased from this optimum.

Table 1. Early yield, total yield, and fruit size of Aphrodite and Eclipse by planting arrangement, 2004 and 2005.

Plants/hill by hill spacing (plants/acre)	Early yield (cwt/A)	Total yield (cwt/A)	No. fruit/ acre	Avg. fruit wt. (lb)	% Small	% Med.	% Large
Aphrodite							
1 plt @ 11 in. (7,112)	152.1	502.2	8,040	6.0	22	57	21
2 plt @ 21 in. (7,112)	112.6	456.5	7,367	6.0	30	46	24
1 plt @ 21 in. (3,556)	218.9	381.8	6,009	6.4	23	49	28
2 plt @ 32 in. (4,668)	81.0	374.1	5,911	6.2	24	52	24
1 plt @ 32 in. (2,334)	140.7	342.9	5,293	6.5	18	46	36
Aphrodite average	141.0	411.5	6,524	6.2	23	50	27
Eclipse							
1 plt @ 11 in. (7,112)	92.1	525.3	9,514	5.2	45	44	11
2 plt @ 21 in. (7,112)	48.7	492.6	9,105	5.2	40	54	6
1 plt @ 21 in. (3,556)	192.3	543.8	9,416	5.7	28	57	15
2 plt @ 32 in. (4,668)	51.7	436.5	7,772	5.4	33	58	9
1 plt @ 32 in. (2,334)	95.6	414.9	7,059	5.9	24	65	11
Eclipse average	96.1	482.6	8,573	5.5	34	56	10

Fruit size: Small=<5 lb, Medium=5–7 lb, Large=>7 lb, percentage by number of fruit.